



DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2022-0760; Special Conditions No. 25-827-SC]

Special Conditions: Aptoiz EHF; Non-Rechargeable Lithium Batteries and Battery system Installations

AGENCY: Federal Aviation Administration (FAA), Department of Transportation (DOT).

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for a supplemental type certificate (STC) to install non-rechargeable lithium batteries and battery systems on certain transport-category airplanes. The airplanes, as modified by Aptoiz EHF (Aptoiz), will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport-category airplanes. This design feature is non-rechargeable lithium batteries and battery system in emergency locator transmitters (ELTs). The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: This action is effective on Aptoiz on [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]. Send comments on or before [INSERT DATE 45 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Send comments identified by Docket No. FAA-2022-0760 using any of the following methods:

- *Federal eRegulations Portal:* Go to <https://www.regulations.gov/> and follow the online instructions for sending your comments electronically.
- *Mail:* Send comments to Docket Operations, M-30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE, Room W12-140, West Building Ground Floor, Washington, DC, 20590-0001.
- *Hand Delivery or Courier:* Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE, Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.
- *Fax:* Fax comments to Docket Operations at 202-493-2251.

Privacy: Except for Confidential Business Information (CBI) as described in the following paragraph, and other information as described in title 14, Code of Federal Regulations (14 CFR) 11.35, the FAA will post all comments received without change to <https://www.regulations.gov/>, including any personal information you provide. The FAA will also post a report summarizing each substantive verbal contact received about these special conditions.

Except for Confidential Business Information as described in the following paragraph, and other information as described in 14 CFR 11.35, the FAA will file in the docket all comments received concerning these special conditions. The FAA will consider all comments received on or before the closing date for comments. The FAA will consider comments filed late if it is possible to do so without incurring delay. The FAA may change these special conditions based on comments received.

Confidential Business Information: Confidential Business Information (CBI) is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to these special

conditions contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to these special conditions, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as "PROPIN." The FAA will treat such marked submissions as confidential under the FOIA, and the indicated comments will not be placed in the public docket of these special conditions. Send submissions containing CBI to Nazih Khaouly, Aircraft Systems Section, AIR-673, Technical Innovation Policy Branch, Policy and Innovation Division, Aircraft Certification Service, Federal Aviation Administration, 2200 South 216th Street, Des Moines, Washington, 98198; telephone and fax 206-231-3160; e-mail nazih.khaouly@faa.gov. Comments the FAA receives, which are not specifically designated as CBI, will be placed in the public docket for these special conditions.

Docket: Background documents or comments received may be read at <https://www.regulations.gov/> at any time. Follow the online instructions for accessing the docket or go to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE, Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Nazih Khaouly, Aircraft Systems Section, AIR-673, Technical Innovation Policy Branch, Policy and Innovation Division, Aircraft Certification Service, Federal Aviation Administration, 2200 South 216th Street, Des Moines, Washington, 98198; telephone and fax 206-231-3160; e-mail nazih.khaouly@faa.gov.

SUPPLEMENTARY INFORMATION:

The substance of these special conditions has been published in the *Federal Register* for public comment in several prior instances with no substantive comments received. Therefore, the FAA finds, pursuant to 14 CFR 11.38(b), that new comments are

unlikely, and notice and comment prior to this publication are unnecessary. The FAA finds that, for the same reason, good cause exists for adopting these special conditions upon publication in the *Federal Register*.

Comments Invited

The FAA invites interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data.

The FAA will consider all comments received by the closing date for comments. The FAA may change these special conditions based on comments received.

Background

On April 6, 2022, Aptozy applied for a supplemental type certificate to install non-rechargeable lithium batteries and battery systems in ELTs. Aptozy intends to apply this STC to multiple transport-category airplanes, and may periodically amend this STC to expand its applicability to include additional transport-category airplane makes and models.

Type Certification Basis

Under the provisions of title 14, Code of Federal Regulations (14 CFR) 21.101, Aptozy EHF must show that the airplanes, for which they make application to modify by FAA STC ST00030IB, as changed, continue to meet the applicable provisions of the regulations listed in each airplane's respective type certificate or the applicable regulations in effect on the date of application for the change except for earlier amendments as agreed upon by the FAA.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards because of a

novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the airplane model for which they are issued. Should the applicant apply for an STC to modify another model included on the same type certificate to incorporate the same novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the airplanes modified by STC no. ST00030IB must comply with the fuel-vent and exhaust-emission requirements of 14 CFR part 34, and the noise-certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type certification basis under § 21.101.

Novel or Unusual Design Features

The airplanes listed in the FAA STC ST00030IB approved model list (AML) will incorporate the following novel or unusual design feature:

Non-rechargeable lithium batteries and battery systems installed in ELTs.

Discussion

The FAA derived the current regulations governing installation of batteries in transport-category airplanes from Civil Air Regulations (CAR) 4b.625(d), as part of the recodification of CAR 4b, which established 14 CFR part 25 in February 1965. This recodification essentially reworded the CAR 4b battery requirements, which are currently in § 25.1353(b)(1) through (4). Non-rechargeable lithium batteries and battery systems are novel and unusual with respect to the state of technology considered when these requirements were codified. Non-rechargeable lithium batteries and battery systems introduce higher energy levels into airplane systems through new chemical compositions in various battery-cell sizes and construction. Interconnection of these cells in battery

packs introduce failure modes that require unique design considerations, such as provisions for thermal management.

In January 2013, two independent events involving rechargeable lithium-ion batteries revealed unanticipated failure modes. A National Transportation Safety Board letter to the FAA, dated May 22, 2014, which is available at <https://www.nts.gov, filename A-14-032-036.pdf>, describes these events.

On July 12, 2013, an event involving a non-rechargeable lithium battery in an ELT installation demonstrated unanticipated failure modes. The United Kingdom's Air Accidents Investigation Branch Bulletin S5/2013 describes this event. These events, involving rechargeable and non-rechargeable lithium batteries, prompted the FAA to initiate a broad evaluation of these energy-storage technologies.

On April 22, 2016, the FAA published special conditions no. 25-612-SC in the *Federal Register* (81 FR 23573), applicable to Gulfstream Aerospace Corporation, for the Model GVI airplane. Those were the first special conditions the FAA issued for non-rechargeable lithium battery installations. In that document, the FAA explained its decision to make those special conditions effective on April 22, 2017, one year after publication in the *Federal Register*. In those special conditions, the FAA stated its intention to apply non-rechargeable lithium battery and battery system special conditions to design changes on other airplane makes and models applied for after this same date.

Special condition no. 1 of these special conditions requires that each individual cell within a non-rechargeable lithium battery and battery system be designed to maintain safe temperatures and pressures. Special condition no. 2 addresses these same issues but for the entire battery. Special condition no. 2 requires the battery be designed to prevent propagation of a thermal event, such as self-sustained, uncontrollable increases in temperature or pressure from one cell to adjacent cells.

Special condition nos. 1 and 2 are intended to ensure that the non-rechargeable lithium battery and its cells are designed to eliminate the potential for uncontrollable failures. However, a certain number of failures will occur due to various factors beyond the control of the battery designer. Therefore, other special conditions are intended to protect the airplane and its occupants if failure occurs.

Special conditions 3, 7, and 8 are self-explanatory.

Special condition no. 4 makes it clear that the flammable-fluid fire-protection requirements of § 25.863 apply to non-rechargeable lithium battery and battery system installations. Section 25.863 is applicable to areas of the airplane that could be exposed to flammable-fluid leakage from airplane systems. Non-rechargeable lithium batteries and battery systems contain an electrolyte that is a flammable fluid.

Special condition no. 5 requires that each non-rechargeable lithium battery and battery system installation not damage surrounding structure or adjacent systems, equipment, or electrical wiring from corrosive fluids or gases that may escape in such a way as to cause a major or more severe failure condition.

While special condition no. 5 addresses corrosive fluids and gases, special condition no. 6 addresses heat. Special condition no. 6 requires that each non-rechargeable lithium battery and battery system installation have provisions to prevent any hazardous effect on airplane structure or systems caused by the maximum amount of heat the battery installation can generate due to any failure of it or its individual cells. The means of meeting special conditions nos. 5 and 6 may be the same, but the requirements are independent and address different hazards.

These special conditions apply to all non-rechargeable lithium battery and battery system installations, in lieu of § 25.1353(b)(1) through (4) at amendment 25-123. Sections 25.1353(b)(1) through (4) at amendment 25-123 remain in effect for other battery installations.

These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

Applicability

As discussed above, these special conditions are applicable to the airplane models listed on the AML of STC no. ST00030IB, available online at rgl.faa.gov. All models listed in the AML must be evaluated and determined to comply with these special conditions. Additionally, each new model added to the AML subsequently must also be evaluated and determined to comply with these special conditions.

Should Aptozy apply at a later date for a change to STC no. ST00030IB, to include any other model on the AML to incorporate the same novel or unusual design feature, these special conditions would apply to that model as well.

Should Aptozy apply at a later date for another STC to modify any other model included on the type certificates of the models on the STC no. ST00030IB AML, to incorporate the same novel or unusual design feature, these special conditions would also apply to that model as well. These special conditions are not applicable to those models for which applicable special conditions for rechargeable lithium batteries and battery systems have already been issued against the type certificate for that specific model.

Conclusion

This action only affects the installation of ELTs that contain non-rechargeable lithium batteries and battery systems for airplanes listed on the AML of STC no. ST00030IB. It is not a rule of general applicability and affects only the applicant who applied to the FAA for approval of these features on the airplane.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

Authority Citation

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(f), 106(g), 40113, 44701, 44702, 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for the airplane models listed on the approved model list of supplemental type certificate no. ST00030IB, as modified by Apto.

In lieu of § 25.1353(b)(1) through (4) at amendment 25-123, or § 25.1353(c)(1) through (4) at earlier amendments, each non-rechargeable lithium battery and battery system installation must:

1. Be designed to maintain safe cell temperatures and pressures, under all foreseeable operating conditions, to prevent fire and explosion.
2. Be designed to prevent the occurrence of self-sustaining, uncontrollable increases in temperature or pressure.
3. Not emit explosive or toxic gases, either in normal operation or as a result of its failure, that may accumulate in hazardous quantities within the airplane.
4. Meet the requirements of § 25.863.
5. Not damage surrounding structure or adjacent systems, equipment, or electrical wiring from corrosive fluids or gases that may escape in such a way as to cause a major or more severe failure condition.
6. Have provisions to prevent any hazardous effect on airplane structure or systems caused by the maximum amount of heat it can generate due to any failure of it or its individual cells.
7. Have a failure-sensing and warning system to alert the flight crew, in the event its failure affects safe operation of the airplane.

8. Have a means for the flight crew or maintenance personnel to determine the battery charge state if the battery's function is required for safe operation of the airplane.

Note: A battery system consists of the battery, battery charger, and any protective monitoring and alerting circuitry or hardware inside or outside of the battery. It also includes vents (where necessary) and packaging. For the purpose of these special conditions, a battery and the battery system is referred to as a battery.

Issued in Kansas City, Missouri, on November 8, 2022.

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Policy and Innovation Division,
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